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Farm Machinery in Wisconsin

James I. Clark

The State Historical Society of Wisconsin

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The State Historical Society of Wisconsin
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Threshing by steam power

Farm Machinery in Wisconsin

by

JAMES I. CLARK

THE TWO STEAM locomotives heading west from Racine on a March morning in 1900 were pulling no ordinary train. Hitched behind was a "Case Special," one of the most slam-bang, jazzed up ways of advertising a product the Midwest had ever seen.

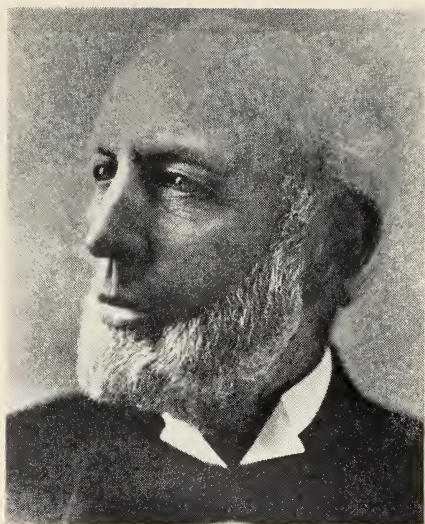
It was a quarter mile from one end of those 28 flatcars to the other. And each was loaded with "Agitator" threshers, the pride of J. I. Case, "the largest threshing machine factory in the world." Those glittering red machines, each emblazoned with a proud, confident eagle perched on top the world, would have been enough. But there was more.

There were flags. There were banners. There were men with pockets stuffed with Case buttons, ready to fling them into the eager, wide-eyed throngs that gathered at every stop. There were men to pass out broadsides, literature, catalogues, advertising sheets. Topping off the show was

a brass band, which whooped it up with silver cornets, sliding trombones, and clashing cymbals at every little town along the way.

West the train rumbled, through Burlington, Delavan, Clinton and Beloit. Then dipping into Illinois, the Special slanted west-southwest over to Savanna, where it pulled in for the night. Next day it was off into Iowa, through Teeds Grove and Lost Nation, Cedar Rapids and Ottumwa, and then south to Missouri.

The same crowds . . . had met the train at every stopping place and the interest that was manifested was plainly demonstrated by the farmers, many of whom had driven as far as ten miles, through roads almost impassable, on account of the heavy rainfall recently through parts of Iowa and Missouri. They would flock around the train and things and wonder at the enormous amount of wealth the train represented.



Jerome Increase Case

At three o'clock in the afternoon of April 2nd the Case Special chuffed into Kansas City, there to unload. As it pulled up to the Grand Avenue station, "thousands of people lined the thoroughfares along the winding tracks and on the viaducts to see the great representation of Wisconsin product." Whereupon the *Racine Journal* correspondent, who sounded suspiciously like a Case man, took a deep breath and exclaimed:

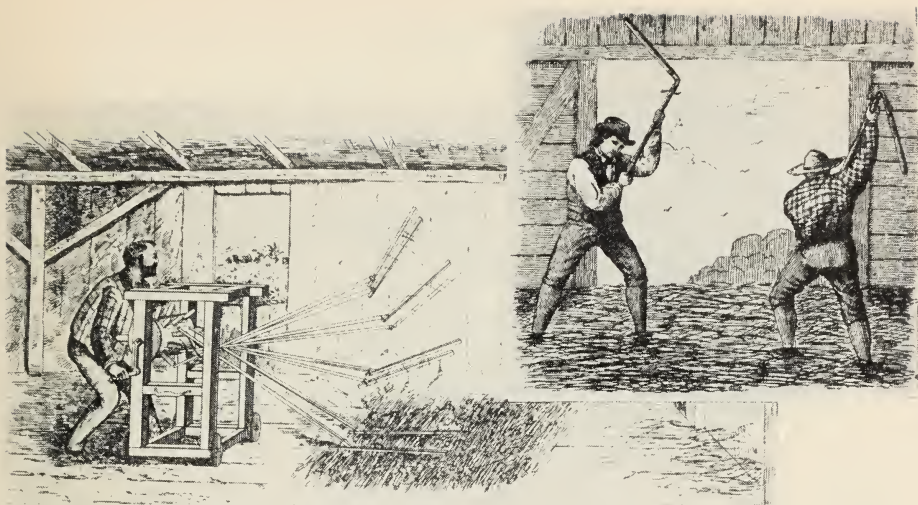
Thousands upon thousands of people have seen something they have not witnessed before and which many perhaps, will never see again. Many of these who have been deprived of the opportunity will hear through friends of the largest representation of any manufacturing concern that ever has entered the west, bound for the western distributing point, which looks after all of the gigantic business through the extreme western territory to the golden shores of the Pacific.

Between about 1880 and 1915 many farm implement companies took advantage of such advertising opportunities while shipping orders across the nation. The trains were often of unusual length and attracted a lot of attention. When the Minneapolis Threshing Machine Company sent fifty cars full of machinery to Lincoln, Nebraska in 1915, one man wrote: "Folks said it was long enough for the engineer to be whistling for Nebraska towns while the machine crowd in the special car attached to the train were still flirting with the girls in Iowa who came to the 'big doings.'"¹

No one knows how much machinery such stunts sold. One thing is certain: people soon learned who made farm implements.

Jerome Increase Case

The Wisconsin man who made them, Jerome Increase Case, had come west from New York state in 1842. Son of a pioneer, Case had learned about wheat from the ground up. While in his 'teens he had become expert with the latest threshing device of the time, the groundhog thresher. That improvement over the slow, tedious labor of separating kernels from straw with a flail was an open-spiked cylinder held in a box-like frame and turned by a hand-crank or a pulley. Grain bundles were held against the cylinder and the wheat stripped from the stalks. Usually the cylinders were made of wood and when out of balance they let out a guttural bellow. That gave the groundhog the nickname, "bull thresher." In an hour those machines equalled the ten bushels per day capacity of a man with a flail.



Flailing by hand, and with a machine

With his groundhog Jerome Case went from farm to farm during harvest season doing custom threshing. When operated by horse tread power his machine turned out from 150 to 200 bushels per day.

The center of the country's wheat production moved steadily westward. Large crops were raised in New York and Pennsylvania, then in Ohio and Illinois. By the 1840s Wisconsin was an important part of the nation's granary.

In 1839 the territory produced a little over 200,000 bushels. The population was then about 30,000. Racine County had 3,475 people and Chicago, a few miles to the south, was a muddy little town of 4,000.

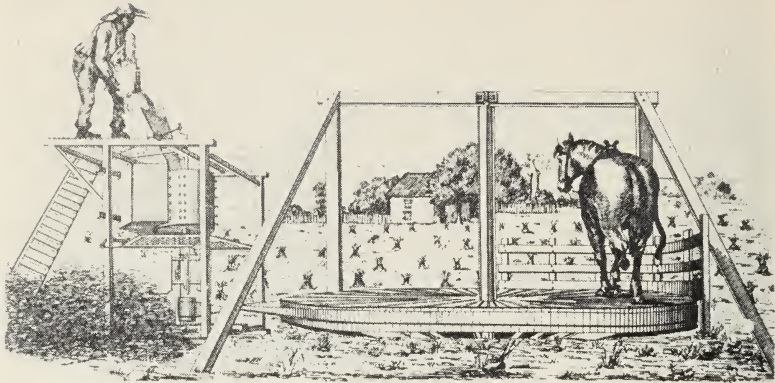
During the next decade a flood of immigration from the east and abroad boosted the population of Wisconsin Territory to over 300,000. Thousands of acres of land were planted and wheat production hit 4 million bushels by 1849. That was the place for a man who knew about

threshing, and that was where Jerome I. Case headed.

He went first to Rochester, Racine County, after selling five of the six groundhogs he had shipped from New York. The sixth he kept to earn his way by custom threshing.

Although the bull thresher was speedier than the flail, the job of separating the kernels from the chaff still remained. It was then commonly done by turning a hand or horse operated fanning mill on the piles of wheat and waste and blowing away the chaff. The advantages of combining the threshing and cleaning operations were obvious to anyone. With the aid of Richard Ela, Rochester manufacturer of fanning mills, Case set out to solve the problem.

Other men were working on the same idea. Two Maine brothers, John and Hiram Pitts, patented a combination thresher-fanner in 1837, although the machine had not yet appeared in the west. Jacob W. A. Wemple of New York had done



Groundhog thresher, with horse tread power

about the same thing, working with George Westinghouse, later the inventor of the air brake.

By the spring of 1844 Case was ready with his combination machine. He demonstrated before a skeptical crowd on a farm near Rochester. After seeing it in action the skepticism rapidly disappeared and Case's custom threshing business increased.

His lack of success in securing water power rights on the Fox river, then controlled by a gristmill and sawmill group, killed plans to manufacture the machine in Rochester. So Case moved to Racine, and in 1847 erected a three-story brick building on the banks of the Root river. The Racine Threshing Machine Works, J. I. Case, Proprietor, was in business. Soon the factory was turning out threshing equipment and horse power devices that would thresh 200 to 300 bushels per day, and which sold for \$290 to \$325.²

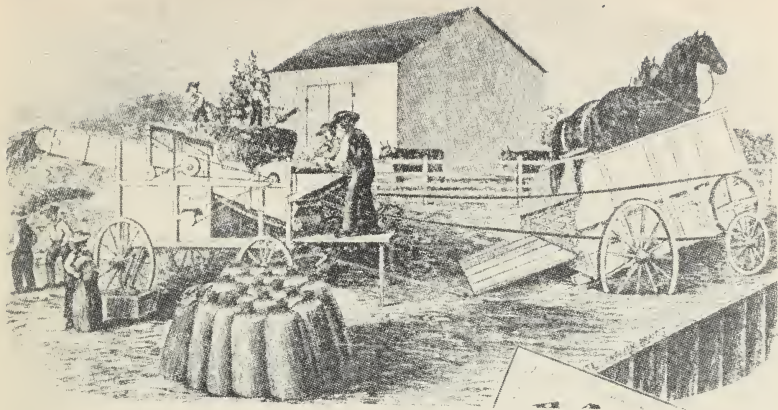
Forward Strides

People of the 19th century saw great advances in agricultural machinery. After slow, tedious labor with cradle, scythe and flail, farmers were

suddenly emancipated by steel plows, reapers, headers, binders and threshers. First run by horse power, then by steam, before 1900 a beginning was made in operating machinery with gasoline engines.

In the early 1830s Obed Hussey at Cincinnati and Cyrus McCormick in Virginia invented reapers. By 1851 McCormick was turning out 1,000 per year at Chicago. C. W. Marsh came out with a harvester that gathered wheat into sheaves. Many other men produced new inventions or improvements in reapers, harvesters, plows, mowers, grain drills, and other farm machinery. They were interested not only in making things easier for the wheat farmer, but also for those who produced corn, flax, sugar cane, barley, and other foods.

The prairie sod of Illinois dramatically underscored the need for a new type plow. The grass roots that extended twelve to fifteen inches into the ground could be cut by the wood and cast-iron plows pioneers brought from the east. The second year's plowing was a different story. The rich soil clung to the moldboard and farmers had to make many irritating,



Case horse power threshing machine, about 1850

time-consuming stops to clean the plows to make ready for the next few yards of furrowing.

A wizard at plow design, Leonard Andrus, and a blacksmith named John Deere got together at Grand Detour, Illinois, in the 1830s and there turned out the first all-steel plow. This was an implement that would cut through the sticky soil, furrow after furrow, and come out as bright and shiny at the end as when it started. When the good news spread, Andrus and Deere couldn't turn out plows fast enough.

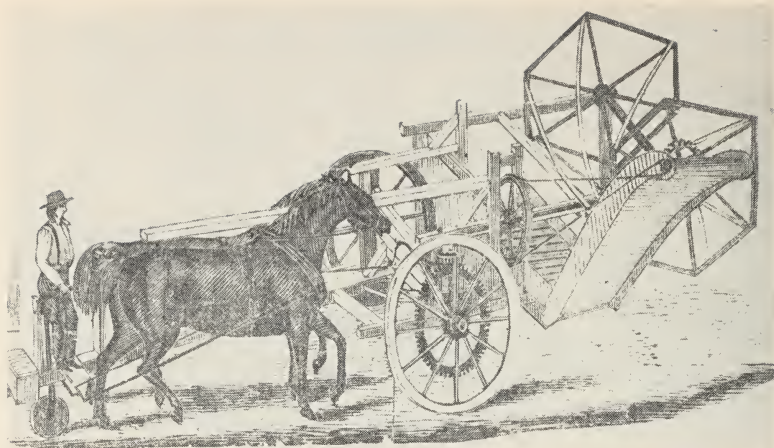
Wisconsin men made a number of important contributions. George Esterly settled on a farm near Janesville in 1843. Lack of help during harvest season resulted in the loss of much of his 200 acre wheat crop. That turned him to invention and in 1844 he produced what has been called the first successful American harvesting machine—a horse-pushed “header.” It had a wide reel revolving on a horizontal axis, mounted on a wheel-supported box. Heads of grain were swept against a knife blade and when cut, fell into a box back of the knife and in front of the

horses. Esterly exhibited the machine at the Chicago Mechanics Institute in 1848 and won a gold medal for the best harvester.

With his header in production, George Esterly perfected other farm equipment. He is credited with the invention of a mowing machine, a plow, hand-rake and self-rake reapers, and a seeder. In 1858 he set up his own manufacturing plant at Whitewater and turned out binders and mowers to serve a large domestic and export trade.

Many men worked on the problem of a suitable binding material for sheaves of wheat that had been cut close to the ground. Straw was used for a long time, although inventors experimented with wire, metal strips, twine and cord. In 1872 S. D. Locke of Janesville adapted an automatic wire binder to a Marsh harvester. About the same time Charles B. Withington, also of Janesville, patented what has been termed “one of the best and most successful wire-binders ever put in the field.” That device was used on both Marsh and McCormick machines.

Wire was not entirely satisfactory.



Esterly Header of 1850

Some farmers were afraid it would damage the threshing machine and others had cows killed from eating straw in which pieces of wire had become lost. Then John Appleby, another Wisconsinite, came out with a device that would answer those objections and would revolutionize the harvester business. Appleby's binder used twine.

Appleby had grown up in Walworth County, having arrived there from New York state in 1845. He had fought in the Civil War and during the Vicksburg campaign had invented an improved magazine and automatic feeder for rifles.

An automatic twine binder had been on his mind for some time, and with the money from the gun patent he was able to devote some time to the problem after the war. In the late 1860s he demonstrated a machine at Mazomanie, Wisconsin, although unhappily it didn't bind properly and broke down several times.

For awhile Appleby gave his attention to wire binders. He patented one in 1869 and later joined a Beloit firm

which produced the device. In 1874 he organized his own reaper works at Mazomanie and returned to work on the twine binder. By 1878 it was perfected and William Deering, large machinery manufacturer, made arrangements to produce it. Soon other companies adapted it to their harvesters and Appleby's twine-binder became known around the world, binding 9/10 of the machine bound grain.

As thousands of farmers pointed all-steel plows into the sunset and were aided in their work by steady improvements in harvesting and threshing equipment, their progress was closely paralleled by westward-weaving networks of iron rails. Railway mileage in the Old Northwest increased from 660 in 1847 to over 7,000 fifteen years later. The farmer, long hampered by difficult wagon hauls over undependable roads, now had transportation that would take his products to the ocean front.

The Crimean War, which involved France, England and Russia, began in 1854 and helped push the price of

wheat up. Less than a dollar a bushel in 1851, it climbed to \$2.50 on the New York Market in 1855. Middle-western harvests doubled and tripled and implement manufacturers could scarcely begin to keep up with orders. Wheat out of Chicago increased from $1\frac{1}{4}$ million bushels to over 10 million. Credit was easy; farmers indulged in unheard of luxuries like elegant buggies, horsehair furniture and expensive watches; times were very good.

Then, as suddenly as it had begun, it ended. On an ill wind from eastern banks and money centers the Panic of 1857 blew westward. The wonderful days were over, for awhile.³

The Growth of Case

The Case Company business had also expanded with the increased wheat production. Even after the panic, the concern somehow kept going. "Mr. J. I. Case informs us that he now keeps constantly employed in the manufacture of threshing machines, about 70 men," reported the *Racine News* in 1858. "He also says that notwithstanding the hard times, present indications are that his sales will be larger than any previous year."

Business dropped off a little however, for in January 1859 Case inserted a notice in the *News* to scotch a rumor that he was trying to hire men at 50¢ a day. Actually he wasn't hiring anyone, and hadn't been for a few months. Yet within another month "The J. I. Case shops are now at work in full blast, with 50 to 60 men at work at the same wages as last year." Two years later the *Advocate* reported that "J. I. Case



John Appleby

shipped 6 threshing machines to California today."

Until the early 1860s all management problems of the Case Company were handled by the founder himself. Case made the sales, worked in the shops, made changes in the machines that farmers diagrammed on scraps of paper, and even took care of collections. That last-named part of the business was often the toughest of all.

Farm machinery was seldom sold for cash. Generally the down payment was small, and the balance paid in regular, agreed upon, though not always promptly fulfilled, installments. During depression times a man collecting past due accounts was more apt to wind up with hogs, cattle, land, lumber, horses and wagons than with cash. Even in good times farmers who bought implements on time were sometimes hard to pin down. Case traveled over much of southern Wisconsin and Illinois as well as other states in search of reluctant, often elusive disciples of the time payment plan.



McCormick Harvester with twine binder, 1881

From a few miles east of Madison he wrote his wife in 1850: “. . . I have ridden late and early since I left Spring Prairie, presented notes to the amount of \$2,500 for payment and have received \$50.00. I tell you these are hard old times to collect money, but I get good promises to have it in by the 25th.” Traveling in those days by horseback, buggy, stage, or even on foot was not always easy. From a farmhouse near Freeport, Illinois one night in 1852 Case wrote how the

horses mired and fell, harness broke and we could go no further. It was dark as well could be, and mud, mud on all sides of us. We tore rails from the fence and laid them down for the ladies to walk on to the fields. Finally we reached this house. The ladies and two children were given beds. The rest of us being men, are sitting up and enjoying ourselves as best we can. I assure you that I am heartily sick of this way of traveling and when I leave home again it will be in my own conveyance. It is now Satur-

day morning, well past one a. m. My comrades have stretched themselves on the floor trying to sleep. I am acting as fireman.

During the Civil War Case took on three partners and distributed the responsibilities of the business, which once more began to boom with increased demand and production of wheat. Before the war ended Wisconsin fields had produced 100 million bushels. To help harvest those crops the Case company produced 300 machines in 1860, and was making 500 a year by 1865.

The company also got a trademark. During the war Jerome Case had seen the 8th Wisconsin's mascot, the eagle “Old Abe.” The bird had been captured by an Indian on the Flambeau reservation and was to scream its way through several battles in the South. When it came time to choose a Case symbol, there was no question about what it should be. First the bird was pictured on a perch. Later it rose to dig its claws into a globe of the world.⁴

The Move to Steam Power

As the market expanded, Case like others continued to improve his machines. The earlier "Sweepstakes" threshers was followed, but not entirely replaced by, the "Eclipse," which came out in 1869.

Threshing machines of the time worked on about the same principle as the old groundhog. They

consisted of a rapidly rotating spiked cylinder playing into a fixed concave, similarly spiked, which performed the operation of hulling the grain as the heads were crushed between the spikes. An endless chain apron to carry the hulled grain, with the chaff, on to vibrating sieves and to carry the straw to the endless chain straw elevator, plus a system of fans to clean the hulled grain and a spout through which to deliver it to the bags, constituted the other essentials.

The Eclipse omitted the apron and used instead an open straw rake back of the cylinder with a grain rake under it to carry the kernels up to a shoe on a tight floor. There was less clogging and delay with the new machine and the litter of grain and chaff underneath was eliminated. It also had a greater capacity than the 300 to 400 bushels per day limit of the Sweepstakes model.

The Eclipse also answered the need for bigger machines, especially among custom threshermen who worked the wheat fields each fall. The Homestead Act of 1862 and the westward expansion of railroads after the Civil War opened more hundreds of thousands of acres to wheat. Minnesota production went from two million bushels in 1858 to fifteen

million ten years later. The same pattern prevailed in other areas west of the Mississippi. Harvesting in the Middlewest was often a race against the weather, and machines were needed that would take care of the abundant crops before they rotted in the field or became covered with snow.

Machines that could thresh 900 to 1,000 bushels of wheat per day demanded better power than could be supplied by horses. One method of using horsepower involved inclined plane treadmills geared to a chain. The weight of one to three horses on an inclined tread revolving platform operated the chain, which in turn ran the machinery. Another device was the sweep treadmill. Here up to fourteen horses might be hitched to long poles, or sweeps. On a platform in the center stood a man who with whip, words, whistles, clucks and shouts kept the animals going at an even pace around the circle. Power from the machine was transferred through a geared rod to the threshers. All this of course was hard on horses that had already put in a long spring and summer in the fields.

In 1782 James Watt discovered a way to convert the reciprocating motion of a steam-driven piston into a rotary motion that would run cranks and flywheels. The steam engine was then practical for industrial use. During the first few decades of the 19th century, when a great deal was done to make steam locomotives bigger and better, steam power was coming into agricultural use. Steam was put to work first on the sugar plantations of the West Indies and later in the southern United States. These

first engines were stationary. By 1838 there were nearly 2,000 of them providing power for cotton gins and presses and sugar mills in the South.

High prices at first kept such machines out of the reach of the ordinary farmer. It wasn't until 1849 that production for general farm purposes got under way. Then someone got the idea of putting the four to thirty horsepower engines on wheels, thus making them more useful all the way around. They didn't move under their own power, however. Horses were needed to pull them from place to place.

In spite of their power and constant improvements in them, steam engines didn't replace the horse as the farmer's best friend. Many threshers stuck with horse treads. Although prices were generally lowered, there were still many farmers who couldn't afford engines. At the same time, reports of violent explosions made many reluctant to accept this new mode of power. Added to the farmers' fears was the inability of insurance company executives to remain calm about future solvency with those spark-belching monsters chugging away in the midst of a tinder-dry grain field. If a farmer's policy wasn't cancelled as soon as the company learned he had bought an engine, additional premiums as high as \$50 to \$100 per threshing day were charged. Some companies insisted on a 24 hour guard to prevent fires. A few years of work on safety devices and public opinion were necessary to make such attitudes less common.

Even with safety features, careless firing, mechanical failure, and any

number of unknown causes resulted in boiler explosions that spread death and destruction for a sizeable area around the threshing outfit. The number of such accidents in comparison to the number of engines in use was small, however.

When a man did throw caution to the winds and buy a steam engine, he was for a brief time the most important man in town. People came from far and near to watch the unloading at the depot. As the proud owner, firmly established in the cast-iron seat, guided his horse-drawn vehicle down the street, he had children, storekeepers, housewives and dogs in his wake.⁵

Self-Propelled Engines

The great success of steam locomotives set many to dreaming of making steam move vehicles along roads. More than one man of vision saw steam power as the answer to freighting across the continent in places where there were no railroads. A Major Joseph R. Brown was one. He planned a freight line from Nebraska City, Nebraska to Denver, and brought an engine up the Missouri to do the job. In July 1862 the first steam road locomotive, powered by 4 ten horsepower engines, started west from Nebraska City. It went twelve miles before breaking down. That was the end of that. Similar plans for crossing the plains with freight and passengers ended as did Major Brown's, if they got that far.

State governments were also interested in steam travel on the highway. In 1875 the Wisconsin legislature offered \$10,000 to anyone building an engine that would travel 200 miles under its own power. Before



Threshing with horse sweep power

long two engines, the "Green Bay" and the "Oshkosh" were offered. A trip from Green Bay to Madison was arranged.

The "Oshkosh" made it without a breakdown; the "Green Bay" never got to Madison at all. Winning the trial turned out to be somewhat easier than collecting the prize money, however. The judges disagreed on whether that much money should be paid for a machine that didn't appear to be cheap and practical enough to be a serious threat to the horse. The problem was passed on to the next legislature, which compromised with an award of \$5,000 to the owners of the "Oshkosh."

Naturally many people were interested in seeing self-propelled steam engines at work in the fields. Custom threshermen had an economic stake in speedy threshing, and although portable engines supplied the power they needed there was still the problem of moving them from one field to another.

At the same time, many saw the advantages of harnessing steam power to a plow. Various attempts were made at that. In 1858 Joseph W. Fawkes performed wonders with a steam plow at the Illinois State Fair in Centralia. The contraption effortlessly turned over several furrows of hard, sun-baked prairie sod. Everyone who witnessed the event was certain the millenium had arrived—until Fawkes tried it again

at Decatur two months later. Here the monster bogged down in soft ground and stayed there.

Finally, after many unsuccessful experiments, it occurred to someone that the shortest route to mobile farm power was to add a propelling power to a portable steam engine. Plows and other equipment could be hitched behind. Once over that hump, the manufacture of steam traction engines—now called tractors—proceeded rapidly.

Portable engines were by no means chased off the market by the appearance of traction equipment. But gradually more and more people swung over to the new form of power. Custom threshermen were especially eager for traction engines. Now they could proceed from one job to another at the rate of about four miles per hour along the road. The sight of a steam traction engine lumbering and snorting down a Michigan country road has been credited with turning the thoughts of young Henry Ford to the subject of horseless carriages.

Self-propelled engines at first had no steering mechanism. Instead, a team of horses hitched in front took care of necessary changes in direction as the machine puffed down the road. Even then horses met along the way raised quite a fuss when approached by a smoking, noisy, spark-throwing engine. Some state laws required that each engine be preceded



Demonstrating a Case steam engine in the 1870's

by a horse, for safety's sake, even after steering devices were perfected about 1880.⁶

These machines were enough to frighten even a human being. Some of them were twelve feet high, and some weighed as much as twenty tons. Huge drive wheels crushed loose rocks on the road or pushed them under the surface. Wheel tracks in the fields could be seen a year later.

And they were expensive. Where a portable engine sold for about \$1,000 or less, by 1900 a complete threshing rig capable of performing the necessary tasks might cost as much as \$4,000. That was more than most ordinary farmers could handle, and they were usually glad to turn their threshing business over to professional crews, which worked the grain fields from Oklahoma and Texas in June north to the Dakotas and Canada by late fall.

Convincing farmers and thresher-

men that they should buy a particular company's product was a job that put salesmen's ingenuity and perseverance to a severe test almost every day. Competition was fierce, and in the midst of the scramble to sell, ethics often got left far behind. As payments weren't made until machinery was delivered, it was not unusual for a salesman to talk a buyer into tearing up a contract just made with a rival company and accepting one from him instead. Sometimes salesmen would milk the cows, feed the hogs, even run the machinery in order to cultivate a buyer's friendship.

Salesmen also had to be skilled mechanics in order to demonstrate and explain the implements and their advantages over a rival's offering. Traveling men sometimes would accept most anything as a mortgage to pay for whatever was purchased. If it turned out that the mortgaged property had little value, collections



Steam operated threshing machine in action

were difficult to make. Salesmen often had to chase many miles to track down their man and get a payment. The experiences of J. I. Case in the early days of his business were repeated over and over by collectors from his and other companies.

Expert steam traction men demonstrating their skill at fairs and other agricultural exhibits was a favorite kind of company advertising. Planks would be laid over a central fulcrum and the rear wheels of a huge machine run up on them. The engine was then run backward and forward without letting the planks touch the ground. At the St. Louis Fair in 1899 one company ran its engine up a large block of wood and then let the wheel down to within three inches of the ground, and there held it. Another stunt involved placing an egg on a plank in front of the drive wheel and moving forward just enough to crack the shell, but not break it. The hinged back case of a

watch would be opened and the watch hung from a post. A stuntman would then back the engine against the watch until the case snapped shut, doing no damage at all to the timepiece. Those were real machines, and real drivers.⁷

Bonanza Farms

While playing up the virtues of their steam traction engines, implement companies lost no opportunity to ballyhoo their threshers and other equipment. At the same time, whenever one company incorporated some new design into its product, other concerns would pooh-pooh it only until they adopted it also. That happened with vibrator threshers.

The Case Eclipse, for example, had been the last word in threshers in 1869. It performed well and sales were good. Toward the end of the 1870s however, vibrator threshers—machines that literally shook the grain from the straw—began to

make news. Case, like the others who had not yet adopted the new principle, made light of it and averred that nothing would really ever replace the old tried and true machines. Yet as rapidly as possible a Case vibrator was perfected and in 1880 the Agitator appeared, to be a good seller for many years.

These new machines needed steady power and didn't work well with any but the most highly trained horses—animals that could start without jerks and continue at an even pace when turning a sweep to supply power for threshing. Needing that kind of power the Agitator and other vibrator machines contributed to the increased use of steam engines on the farm. At the same time, developments in some of the western territories created a market for bigger and more efficient machine power. The Bonanza Era of Dakota Territory had begun shortly before the Agitator came out.

The Red river rises as the Boies Sioux in Lake Traverse, South Dakota. It flows north through Fargo and Grand Forks, North Dakota, forming the boundary between that state and Minnesota, and empties into Lake Winnipeg, in Canada. Rich fur country for the French and British, the agricultural settlement of the valley had been slow. It was hard, bitter country, with long, cold winters. Even past the mid-19th century it was land used mainly by the Sioux, who were far from pacified. Those farming the area were hit by grasshoppers in 1872 and 1874, which left almost total loss in their wake.

After the Panic of 1873 the Northern Pacific Railroad, owner of con-

siderable Red river land, was in serious trouble. Two stockholders, George W. Cass and George Cheney, exchanged their paper for large tracts of that Dakota land. Then they came under the spellbinding influence of J. B. Powers, a railroad land commissioner convinced that the Red River Valley would produce monstrous crops, if someone would get into the business. Cass and Cheney listened, and sent Powers west to find 11,520 acres and a man to farm them. Powers found the land easily enough. He also found Oliver Dalrymple.

Dalrymple had come to Minnesota to practice law some years before. He didn't get much practice, but he did collect considerable acreage from defaulted farm loans. Having little else to do he planted 2,500 acres to wheat and soon had an income of \$40,000. He was just the man to manage the large Case and Cheney holdings.

In 1875 gangplows broke only 1,280 acres of Red river land, but that produced 32,000 bushels of wheat. The immense possibilities of the area had been proved and by 1879 the rush was on. More than 4,000 experienced farmers in Wisconsin, whose land had been producing less and less wheat over the years, took off for Dakota. Others came from Pennsylvania, Michigan, Illinois, Minnesota and many other states. From Europe came immigrants to homestead the valley. Within the next few years production was measured in the millions of bushels.

Harvesting those crops provided seasonal work for many people. Col-

lege boys headed west to earn money, farmers' sons went out to pitch bundles and help run threshing rigs. Lumberjacks from Wisconsin and Minnesota rode the rails out to the Red River country, to work in the wheat fields until tree-cutting time in the fall.

There were a lot of small farms, but some of the layouts were so huge as to stagger the imagination. Two thousand farms were over 500 acres each. The really big ones went to 17,000, 34,000 and up. The biggest farm in the world (so-called), the Cass-Cheney-Dalrymple holding, covered 75,000 acres.

This grand scale production required a lot of machinery. Over 150 gangplows moved across the fields in the spring, breaking the sod. An equal number of self-binders worked during harvest time. And when the grain was cut, twelve or more extra-large steam outfits with hundreds of men, horses and wagons turned out enough wheat to fill two daily trains for Minneapolis and a steamboat every other day from Duluth.

While wheat boomed in the Red River Valley, similar farms were producing large quantities of the grain in California. Dr. Hugh J. Glenn, who had arrived there in gold rush days, made good money in a freighting business. Later he invested in land. In the late seventies he was styled the greatest wheat farmer in the world.

By then he had 45,000 Sacramento Valley acres under cultivation. With constant expansion, by 1880 his land produced a million bushels. Just to plow that much land, it was said, a gangplow outfit could start early

in the morning, have lunch in the middle of the field, keep going in the same direction all afternoon, and camp that night at the end of the furrow. Next morning the plows would start back.⁸

The Combine

There were other farms in California, both large and small, and others in Oregon and Washington. But none of them equalled the size of Dr. Glenn's. It was on such farms as his that combines were first used to any great extent.

The idea of a combine was almost as old as that of a mechanical thresher. One had been built and operated in Michigan in the 1830s and had cut and threshed about 25 acres in a day. That was the machine of Hiram Moore, who has been called "the father of the combine."

Moore came to Michigan from Vermont. With the aid of a man named Hascall, he turned out what was actually a huge threshing machine in 1836. That machine cut the heads from the grain and sent them over an endless apron to the cylinder. After grain and straw had been separated a fanning apparatus cleaned the wheat and delivered it into bags. Moore built four such machines in Michigan and operated them on a custom basis for \$3.00 per acre.

He moved to Wisconsin in 1853 and settled on a large farm on Green Lake Prairie, about 8 miles south of Ripon. There he improved his combine and also worked on a force-feed grain drill and other farm machinery.

It was in California, rainless from May to November, where the combine really came into its own. Combining required evenly ripened, dry

grain. That was hard to find in the Midwest, where rain, or even snow in some places, might interrupt the harvest at any time. A Moore-Hascall machine was shipped to California in 1854, and a San Joaquin Valley paper reported that year:

A team of twenty horses takes this mighty wholesale harvester steadily through the field—the knives take off every head clean and carry them over a cloth drawn from the thresher, this in turn taking them into the separator and the fan-mill, and from thence up a hopper into the bags, these are filled, sewed up, and rolled gently off into the field behind the machine. At the close of the day's work the harvester looks back and sees twenty acres of headless straw, while the decapitated grain lays over the broad field in well-filled bags, resembling hundreds of large sheep.

These machines were used at first only on the larger farms; the average farmer couldn't afford the investment. But additional improvements and gradually lowered prices brought them nearer the more ordinary farmer's pocketbook. Then during World War I, when farm help was scarce, the use of combines increased all over the country. They did a cheaper job as well as a faster one.

Without the combine, grain had to be cut, bound, shocked or stacked, hauled to the threshing machine, pitched onto a cutting table, the bands severed, then fed by hand into the threshing cylinder. A great many men were needed to perform those operations. Farm women had grown old fast during harvest season when two dozen or more hungry hands had

to be provided with mountains of food four or more times each day. They welcomed the advent of a single operation machine that needed fewer men.⁹

Into the Gas Engine Era

The combine came into more general use about the time that gasoline engines were being developed. It was the Hart-Parr Company that produced what is considered the first really successful traction engine powered by gas, and that happened shortly after the 20th century began.

Charles W. Hart, an Iowan, and Charles H. Parr, from Wyoming, Wisconsin, met at the University of Wisconsin. Mechanical engineering students, they built a few stationary gas engines at Madison and in 1900 moved to Charles City, Iowa. After two years of work and experimentation, the two men produced several two-cylinder, slow speed 20 to 45 horsepower engines. They were soon on their way to fame and fortune. Wanting to shorten the name of their product from "gasoline traction engine," it has been said, they hit upon the word "tractor." Whether they were first to think of the word is a matter of dispute, but probably they arrived at it without knowledge of its previous use.

By 1907 the Hart-Parr Company was making a third of the 600 gas tractors then in use. Those machines produced considerable power, if they could be started and kept running, although many of them weighed as much as eleven tons. Gradually the size was reduced and by World War I there were about 14,000 of various sizes and makes on American farms.

By that time another Wisconsin

company besides Case was in the field. That was Allis-Chalmers.

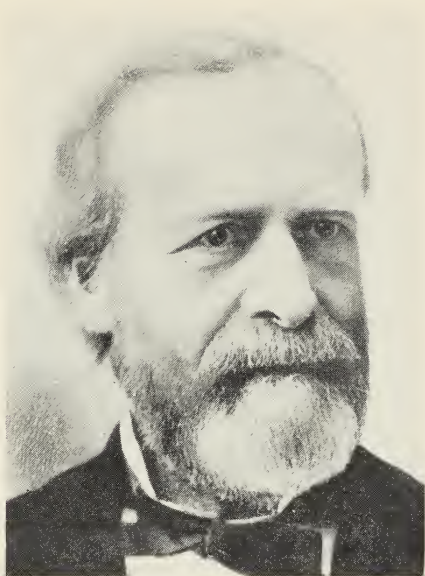
E. P. Allis of Milwaukee had taken over the Reliance Iron Works at the beginning of the Civil War. Allis had the ability to anticipate mechanical needs of his time and could hire specialists to build machines to fill those needs. By the time he died in 1889 the business had grown in worth from \$31,000 to over \$3 million a year. The company turned out, among other things, pumps, engines, flour and sawmill machinery and water pipe.

In 1901 the Allis-Chalmers Company came into being, the result of the merger of four companies. Now it produced mining machinery, pumps, air compressors, electrical equipment, rock-crushing and cement-making machinery as well as a long list of other machines.

Its first tractor, weighing 4,000 pounds and resting on three wheels, was brought out in 1914. During the 1920s and 1930s more lines of agricultural machinery were added until Allis-Chalmers became one of the foremost names in farm implements.

In Beloit a man named Israel Love was turning out harvesters as early as 1850. Parker and Stone, who manufactured Appleby's twine binder, began operations there in 1857. Other Wisconsin companies included the Milwaukee Harvester Company, also a manufacturer for Appleby, which was taken over by International Harvester in 1902, and the Van Brunt Seeder Company.

In 1927 Massey-Harris, a Canadian company, joined the lists as a manufacturer of farm machinery in Wisconsin. In that year Massey-



Edward P. Allis

Harris purchased the J. I. Case Plow Works, which had been organized in 1876, and continued to make the Willis gas tractor which had been produced by the Case plow company in Racine.

By 1915 the end of steam on the farm was well in sight. The Case threshing machine company that year still manufactured almost twice as many steam engines as its nearest competitor—952—but that was quite a drop from its peak production of over 2,300 four years before.

The last Case steam engine of any kind was produced in 1926.¹⁰

It has been said that a grain farmer of Biblical times would have been quite at home on a wheat farm in 1830. A brief half-century or so later, however, the American farmer had moved a far distance from the cradle and the flail. He had become something of a businessman and something of a mechanic too. Farm

machinery had given him a better life, more comfort, and more leisure time. Tractors, threshers and other implements aided in producing abundant harvests year after year, and contributed to the growth of cities and the gradual decline of the farm population.

The story of farm machinery is the story of many inventors and many men of vision and perseverance all over the country, experimenting, improving, redesigning to produce a better, more efficient product. And in it all, Wisconsin men and companies played an important part.

NOTES

¹ Racine *Journal*, April 5, 1900; Beloit *Daily Free Press*, March 30, 1900; *American Thresherman*, July, 1915:17.

² Stewart Holbrook, *Machines of Plenty* (New York, 1955), 21-34; *Dictionary of American Biography*, 3:556-57.

³ Holbrook, *Machines of Plenty*, 176-82; R. L. Ardrey, *American Agricultural Implements* (Chicago, 1894), 40-76; J. Quinn Brisben, "John Appleby, Farmers' Friend at Harvest Time," *30th Star*, 1:1-2 (January, 1955).

⁴ Racine *News*, March 31, 1858, January 24, 1859; Racine *Advocate*, January 18, 1860; Reynold M. Wik, "J. I. Case: Some Experiences of an Early Wisconsin Industrialist," *Wisconsin Magazine of History*, 35:3-6, 64-67 (Autumn, 1951); Holbrook, *Machines of Plenty*, 48-50.

⁵ Reynold M. Wik, *Steam Power on the American Farm* (Philadelphia, 1953), 1-60; Joseph Schafer, "Editorial Comment: Hiram Moore, Michigan-Wisconsin Inventor," *Wisconsin Magazine of History*, 15:234-43 (December, 1931).

⁶ Wik, *Steam Power*, 60-82; Madison *Wisconsin State Journal*, October 29, 1916.

⁷ Wik, *Steam Power*, 157-63.

⁸ *Ibid.*, 48-54; Holbrook, *Machines of Plenty*, 71-86.

⁹ Schafer, "Editorial Comment," 235-43; Charles L. Hill, "The First Combine" *Wisconsin Magazine of History*, 35:263-66 (Summer, 1952).

¹⁰ Holbrook, *Machines of Plenty*, 167-68; Wik, *Steam Power*, 200-14; Merrill Denison, *Harvest Triumphant, The Story of Massey-Harris* (New York, 1949), 278, 282; Bayrd Still, *Milwaukee, The History of a City* (Madison, 1948), 338-39; Walter Geist, *Allis-Chalmers: A Brief History of 103 Years of Production* (New York, 1950); William T. Hutchinson, *Cyrus Hall McCormick* (2 vols., New York, 1935), 2:553-54.

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